

Magnetic & Pressure Products



R E L I A B L E . A C C U R A T E . S O L I D .



The Solid State Electronics Center.

Honeywell SSEC fuses the proven reliability of Honeywell with innovative solid state solutions. We provide integrated circuits and sensors for products ranging from wristwatches to military satellites — rugged solutions designed to function optimally even in extreme conditions. We build all SSEC products and solutions upon our Total Quality Management (TQM) process, which means we do more than just supply products for your needs — we understand your needs and exceed your expectations. Plus, all of our products are backed by Honeywell, recognized around the globe as a leader in manufacturing, technology and quality.

Honeywell SSEC: Providing solid solutions and a new level of service.

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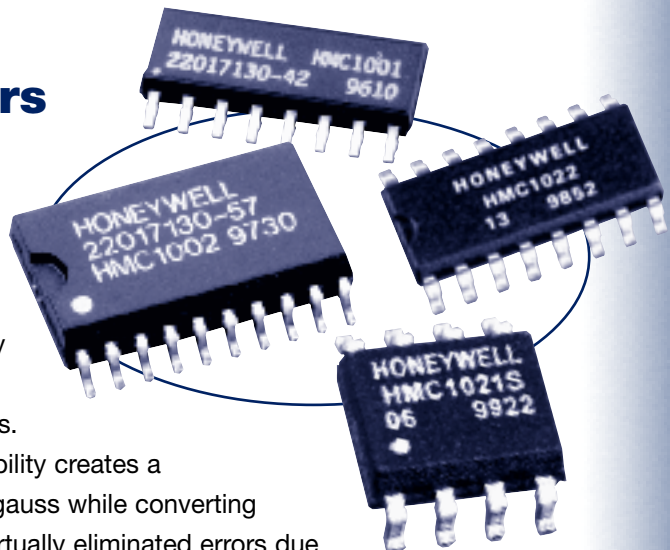
Magnetic Products

Even the tiniest magnetoresistive sensor allows you to harness the earth's entire magnetic field and Honeywell SSEC manufactures the most sensitive and reliable low-field sensors in the industry. We build products that accurately detect the presence and magnitude of the earth's magnetic field. Our magnetoresistive technology provides the ideal solution for your compassing, navigation and position sensing needs. Honeywell SSEC magnetic products range from discrete sensors for low-cost applications to high-performance, solid state magnetometers and compass modules designed to function optimally on any platform. Applications include:

- **compassing**
- **platform orientation**
- **down hole drilling**
- **navigation systems**
- **position sensing**
- **medical instruments**

1- and 2-Axis Magnetic Sensors (HMC1001, HMC1002, HMC1021 and HMC1022)

These sensors are high in sensitivity and reliability, built with our solid state magnetoresistive technology. They are specifically designed to be low in cost for high volume OEM applications. Used individually, they can sense fields on either one or two axes. Combined they allow three-axes sensing. This flexible configurability creates a powerful tool capable of sensing magnetic fields as low as 30 μ gauss while converting the data into a differential output voltage. These sensors have virtually eliminated errors due to hysteresis and repeatability. These sensors are the building block components in our magnetometers and compasses. Solid state and small size reduce your board assembly costs and improve reliability and ruggedness.

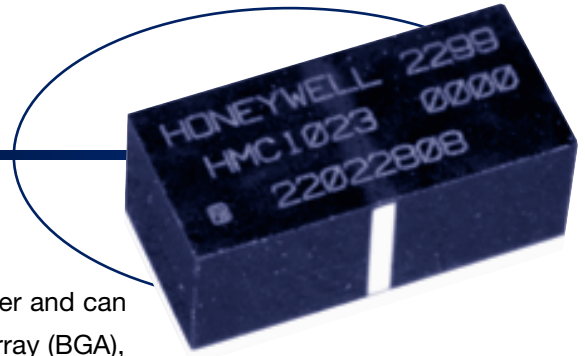


- **Wide field range of up to ± 6 gauss**
- **Low hysteresis and high repeatability**
- **Small package**
 - 1-axis part in an 8-pin SIP, 8-pin SOIC or a ceramic 8-pin DIP package
 - 2-axis part in a 16-pin or 20-pin SOIC package
 - designed for the 1- and 2-axis to cooperatively provide 3-axis sensing
- **Patented on-chip straps can reduce the effect of temperature drift, non-linearity errors, offset errors, and effects of hard iron distortion**
- **Cost-effective for high volume OEM applications**

Three-Axis Magnetoresistive Sensor (HMC1023)

Compact, highly-sensitive and low power, the HMC1023 is designed to excel in applications requiring precise orthogonal sensing of the x, y and z axes. Improved design draws less power and can operate with less than 3 volt supply. Using a custom Ball Grid Array (BGA), with 1mm pitch the HMC 1023 board-level footprint (31mm^2) is the smallest 3-axis magnetic sensor available and its sensitivity of 85 μGauss far exceeds its closest competition.

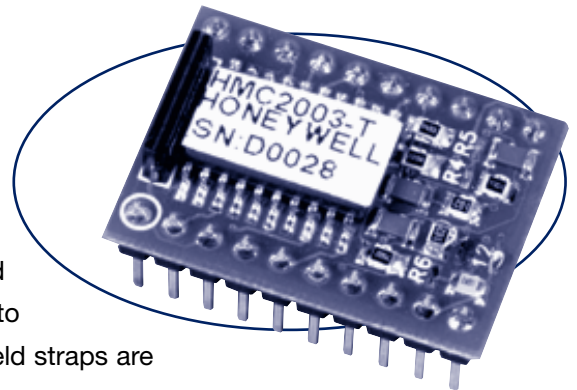
- **Small package is designed to work as a stand alone three-axis magnetoresistive sensing system**
- **Solid state design reduces board assembly costs, improves reliability and ruggedness compared to mechanical fluxgates**
- **Low power requirement allows this sensor to operate with a power supply as low as 3V, lowering power consumption and reducing support circuitry**
- **Wide field range of ± 6 gauss, while maintaining high sensitivity with a minimal detectable field as low as 85 μGauss**



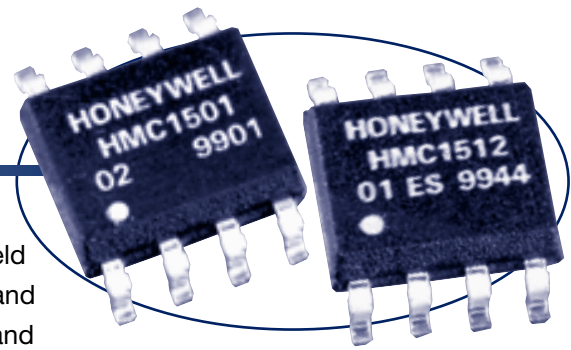
Three-Axis Magnetic Sensor Hybrid (HMC2003)

A complete 3-axis magnetometer with analog output in a 20-pin hybrid DIP package. It uses Honeywell's sensitive HMC1001 and HMC1002 MR sensors and precision instrumentation amplifiers to measure magnetic fields on x, y and z axes. Patented integral field straps are accessible for applying offset fields or closed loop operation.

- **Small size of 1 x 0.75 inches allows easy insertion into system level boards**
- **Solid state construction improves ruggedness and reliability**
- **Wide dynamic range accurately measures fields from 40 micro-gauss to ± 2 gauss at 1 V/gauss**
- **0 to 5 volt analog output with +2.5V internal reference improves measurement accuracy and stability**
- **Offset and set/reset straps allow magnetic field offsets or closed loop circuit applications and may enhance output signal accuracy**
- **Non-magnetic material packaging reduces magnetic distortion and offsets**



Linear/Angular/Rotary Displacement Sensors (HMC1501/HMC1512)

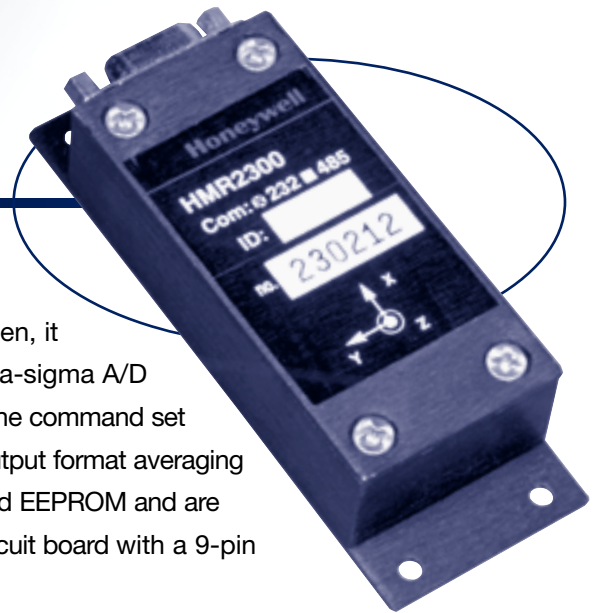


The HMC1501 and HMC1512 sensors measure the angle and position of a moving magnet. Since they do not measure field strength, they are insensitive to magnet temperature variations and less sensitive to shock and vibration. These sensors can withstand large variations in the gap between the sensor and the magnet. Both can operate on < 3V with a bandwidth response up to 5 MHz.

- **Operates with low cost magnets, unlike competitors that require costly rare earth magnets**
- **Wide angular range; the HMC1501 has an angular range of $\pm 45^\circ$ with $< 0.07^\circ$ resolution, while the HMC1512 has an angular range of $\pm 90^\circ$ with $< 0.07^\circ$ resolution**
- **Typical 14mm linear range with a single sensor, range may be increased through multiple sensor arrays operating together**
- **Absolute sensing allows sensors to know the exact position, requiring no indexing for proper positional output**
- **Non-contact sensing means no moving parts to wear out and no dropped signals from worn tracks**
- **Small package with case-only dimensions of 5mm x 4mm x 1.2mm**
- **Large signal output range of 120mV with 5V supply**

Smart Digital Magnetometer (HMR2300)

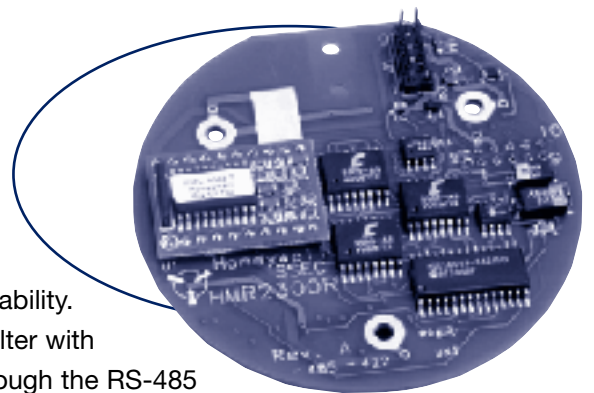
The HMR2300 is a low cost, compact and highly reliable magnetometer that uses Honeywell's HMC 2003 analog magnetometer to sense the x, y and z axes of a magnetic field. Then, it converts the output into a 16-bit digital value with an internal delta-sigma A/D converter and communicates it directly to your computer. Using the command set provided with the HMR2300, you can configure data sample rate, output format averaging and zero offset. Any configuration changes are stored in the on-board EEPROM and are accessible for the next power-up. The HMR2300 is available as a circuit board with a 9-pin connector or in an aluminum enclosure.



- **Microcontroller-based smart sensor**
- **Low cost and easy to use—just plug and read**
- **Range of ± 2 Gauss— <70 μ Gauss resolution**
- **High-accuracy over ± 1 Gauss— $<0.5\%$ FS**
- **Output rate selectable—10-154 samples/second**
- **Three-axis digital output—BCD ASCII or Binary**
- **RS-232 or RS-485 serial output—9600 or 19200**

Three-Axis Strapdown Magnetometer (HMR2300r)

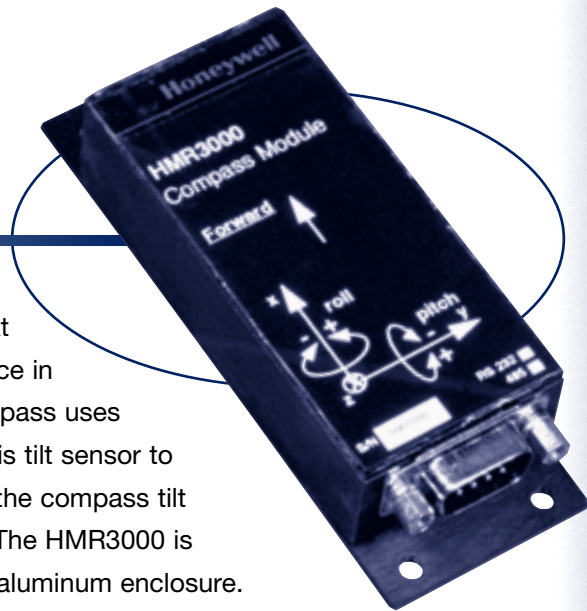
The HMR2300r detects the earth's magnetic field through the x, y and z axes, communicating the data via serial bus. Its strapdown design uses no moving parts, ensuring maximum durability. The HMR2300r has a high accuracy rate, bolstered by a digital filter with 50/60 Hz rejection and low magnetic field sensitivity. Further, through the RS-485 standard, it can connect to 32 devices on a single wire pair of up to 4,000 feet. It provides the user with 55 bytes of data storage on the EEPROM. Compliant with applicable MIL-STD-810E military and commercial flight systems requirements, the HMR2300r is designed to replace bulky fluxvalve sensors.



- **Strapdown magnetometer replaces bulky fluxvalves**
- **Microprocessor-based smart sensor**
- **Range of ± 2 Gauss— <70 μ gauss resolution**
- **Readings can achieve heading resolution of 0.02°**
- **Rate selectable—10 to 154 samples/sec.**
- **Repeatable and reliable—MTBF $> 50,000$ hours**
- **Slaveable to AHRS systems**

Digital Compass Module (HMR3000)

The HMR3000 Digital Compass Module provides electronic heading and orientation for navigation and guidance systems that can interface directly to a computer via digital RS232/485 interface in NMEA format. This high performance, solid state, electronic compass uses Honeywell's patented Magnetic Sensor technology and a two-axis tilt sensor to provide accurate heading, pitch and roll information, even when the compass tilt angle is $\pm 40^\circ$. This compass is easy to use, rugged and reliable. The HMR3000 is available as a circuit board measuring 2.95 x 1.2 inches or in an aluminum enclosure.



- **20 Hz fast response time through solid state design**
- **Small size 3.25 x 1.5 x 0.88 inches per side Aluminum enclosure**
- **Low power of 35 mA at 5 VDC allows for long operation with a battery**
- **Accuracy of 0.5° with 0.1° resolution for critical positioning applications**
- **Wide roll and pitch tilt range of $\pm 40^\circ$ for more dynamic applications**
- **Hard iron calibration corrects for distortion from vehicle/platform and nearby magnetic objects**
- **User configurable features include baud rate, update rate, output format, units, filter settings and deviation angles; alarms and warnings are stored internally**

Hand Held Display (HMD5000)

This hand held display is designed to provide digital readouts for the HMR3000 Digital Compass Module and the HMR2300 Three-Axis Smart Digital Magnetometer. It displays heading, pitch, roll and status information when linked to the HMR3000. When used with the HMR2300, it displays magnetic field readings in the X, Y and Z axes, as well as the magnitude of all three-axis combined.



Pressure Products

Honeywell SSEC combines thirty-five years of experience in world leading, silicon piezoresistive pressure sensors with advanced microprocessors and digital compensation firmware to offer precision, digital, networkable pressure transducers. Our precision pressure products, backed by renowned Honeywell quality and service, provide the industry's most reliable pressure readings — especially in high performance applications. Honeywell SSEC precision pressure products are built to provide you cost-effective solutions to your system needs, with features of 0.05% accuracy over temperature, networkability, and flexibility. Applications include:

- **avionics**
- **general meteorology**
- **instrumentation**
- **flight test**
- **calibration equipment**
- **process control**
- **level sensing**
- **altimeters**

Precision Pressure Transducer (PPT)

The PPT combines proven silicon sensor technology with microprocessor-based signal conditioning to provide an extremely powerful pressure transducer. The ability to provide high accuracy over a wide temperature range, coupled with many software features and a compact, rugged design, makes it the most versatile and cost-effective precision pressure transducer available on the market today.

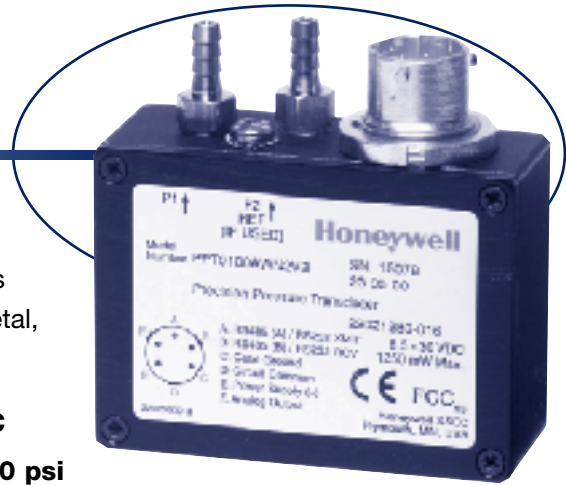
- **High accuracy: 0.05% FS typical error over -40 to 85°C**
- **Standard full-scale pressure ranges between 1 and 500 psi**
- **Absolute, Gauge and Differential pressure types**
- **Interfaces to PC: RS232 digital output coupled with 0-5V analog**
- **Networkable: RS485 digital output coupled with 0-5V analog**
- **Temperature output from the sensing element**
- **Smart — Over 30 software features**
- **Accessories: Power Supply/Data Cable, Mating Electrical Connectors**



Precision Pressure Transducer CE Marked

The CE-marked PPT provides all the features of the standard PPT while complying to international emission and immunity standards. In addition to providing EMI protection, other features included with the CE-marked PPT are surge protection and a metal, 6-pin military connector.

- **High accuracy: 0.05% FS typical error over -40 to 85°C**
- **Standard full-scale pressure ranges between 1 and 500 psi**
- **Absolute, Gauge and Differential pressure types**
- **Interfaces to PC: RS232 digital output coupled with 0-5V analog**
- **Networkable: RS485 digital output coupled with 0-5V analog**
- **Temperature output from the sensing element**
- **Smart — Over 30 software features**
- **Conforms to Electromagnetic Compatibility Directive 89/336/EEC**
- **Accessories: Power Supply/Data Cable, Mating Electrical Connectors**



Honeywell Precision Barometer (HPB)

Based on Honeywell's proven pressure sensor technology, the HPB provides a cost-effective solution for accurate and stable barometric pressure measurements. Its two-tiered accuracy selection, ± 0.4 hPa (mbar) and ± 0.8 hPa (mbar), offers two valuable solutions based on the application. Its accuracy over the entire temperature range eliminates the need to insulate or temperature-regulate the barometer. The HPA is an altimeter variant of the HPB, providing two-tiered accuracy of 0.03% FS and 0.06% FS maximum.

- **High accuracy: ± 0.4 hPa (mbar) maximum error over -40 to 85°C (HPA: $\pm 0.03\%$ FS error over -40 to 85°C)**
- **Pressure range of 500- 1200 hPa (mbar) for HPB and 0-17.6 psia for HPA**
- **TTL output for low (33 milliwatts) power consumption**
- **Smart — Many software features**
- **Accessories: Power Supply/Data Cable, Mating Electrical Connectors, TTL-to-RS232 Converters**



Precision Pressure Transducer Ruggedized (PPTR)

The PPTR provides a rugged transducer for use in harsh environments. While maintaining all of the PPT's many benefits, the PPTR is designed with an isolation diaphragm, which offers pressure sensing solutions for conductive and some corrosive media applications. Its hermetically sealed, stainless steel construction eliminates humidity effects and provides excellent emission and immunity protection. Tested to very high vibration, thermal and mechanical shock standards, the PPTR is an excellent choice for any tough application.



- **High accuracy: 0.1% FS typical error over -40 to 85°C**
- **Standard full-scale pressure ranges between 10 and 3000 psi**
- **Absolute and Gauge pressure types**
- **Interfaces to PC: RS232 digital output coupled with 0-5V analog**
- **Networkable: RS485 digital output coupled with 0-5V analog**
- **Temperature output from sensing element**
- **Smart — Over 30 software features**
- **Conforms to Electromagnetic Compatibility Directive 89/336/EEC**
- **Accessories: Power Supply/Data Cable, Mating Electrical Connectors**

Precision Pressure Transducer Explosion-Proof (PPTE)

The PPTE is an explosion-proof version of the PPTR. Built with the ruggedness of the PPTR, the PPTE is an excellent choice to be used in applications where protection in hazardous locations is critical. The PPTE has been tested and approved by the Canadian Standards Association and Factory Mutual.



- **Explosion-Proof Class I, Groups B,C,D; Class II, Groups E,F,G; Class III**
- **High Accuracy: 0.1% FS typical error over -40 to 85°C**
- **Standard full-scale pressure ranges between 10 and 3000psi**
- **Absolute and Gauge pressure types**
- **Interfaces to PC: RS232 digital output coupled with 0-5V analog**
- **Networkable: RS485 digital output coupled with 0-5V analog**
- **Temperature output from the sensing element**
- **Smart — Over 30 software features**
- **Conforms to Electromagnetic Compatibility Directive 89/336/EEC**

Precision Pressure Indicator (PPI100)

The PPI100 is a pressure monitoring instrument that houses PPT and PPTR transducers in easy to interchange modules. Containing from one to three modules, the instrument displays the transducer outputs and allows configuration from the front panel using single function buttons and a menu-driven set of commands. The bright vacuum fluorescent display offers superior readability. Optional accessories include remote transducer and relay alarm modules.



- **Fully temperature-compensated outputs meet specified accuracies from -20 to 60°C**
- **Supports PPT (1 to 500 psi) and PPTR (10 to 3000 psi) pressure ranges**
- **Interchangeable modules allow gas or fluid measurements**
- **Allows user-specified pressure ranges, damping, update rate, flag set, tare and other customized parameters**
- **Special function buttons allow instant zeroing, display hold, min/max recall and other useful functions**
- **Modules available for remote sensing and relay alarms**

Remote Digital Display (RDD100)

The RDD100 is a convenient, compact accessory that enhances the use of the PPT and PPTR by displaying their outputs. Capable of displaying any of 16 pressure units on its six digit LED, it allows remote mounting locations at distances up to 50 feet (15m). Its computer interface allows data collection while observing the transducer output. Configure the PPT for update rate, damping and other parameters through the computer link.



- **Direct output: Displays continuous stream of RS232 data directly from transducers**
- **Fast, easy setup: Factory supplied interface cables and single wall mount power supply**
- **Computer interface: 9-pin "D" cable ports the output to a personal computer**
- **Pressure Units: atm, bar, mbar, inwc, ftwc, cmwc, mwc, inHg, mmHg, kg/cm², KPa, MPa, psi, user supplied, logic common value, percent full scale**





Honeywell

Solid State Electronics Center

Honeywell

12001 Highway 55

Plymouth, MN 55441

Tel: 800-323-8295

<http://www.ssec.honeywell.com>

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